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On capital flows and macroeconomic performance: Evidence before and after the financial crisis in Turkey ☆

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Abstract

The paper sheds light on the Turkish experience of capital account liberalization and its effect on key macroeconomic variables, using quarterly data in a multivariate VAR model. We also take into consideration the crisis breakpoint in 2001 and estimate the effect of shocks attributed to capital flows, using quarterly data during the sub-periods 1989:01–2001:01 and 2001:02–2009:03. The findings indicate that capital flows have varying effects on the Turkish economy before and after the crisis in 2001 and the evidence supports significant effects of liberalizing financial flows on macroeconomic performance, especially during the post-crisis period (2001:02–2009:03). Moreover, this latter period exhibited evidence of sterilization policy that has helped mopping up excess liquidity and containing inflationary pressures. These factors seem to signal deliberate efforts by the Central Bank of Turkey to stem the risk of appreciation of the real exchange rate and preserve export competitiveness during periods of high financial inflows, a trend that has been reversed recently by the surge in outflows and currency depreciation in many emerging markets in anticipation of imminent normalization of monetary policy in the United States.

JEL classification: G 20; G 28; O 55

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1. Introduction

Over the past two decades, many countries in the developing world have taken measures to liberalize their capital and financial accounts in order to capitalize on a larger pool of global liquidity that seeks opportunities for higher return across the globe against the backdrop of easing monetary policy in many advanced economies in the wake of the global financial crisis that has left the world awash of liquidity searching for competitive returns across borders. There is a widespread belief that more financial and capital inflows could play a fundamental role in boosting growth and welfare by improving the allocation of capital based on productivity and rate of return across recipient countries. However, in the aftermath of the global financial crisis, concerns have risen about the risk of speedy financial integration in developing countries, in the absence of necessary reforms to ensure prudence and mitigate potential risk. To substantiate these arguments, we cite some cases where previous experiences of financial liberalization may have turned to be disastrous and contributed to wide-spread financial crises in Mexico (1994), South East Asia (1997), Russia (1998), Brazil (1999), Turkey (2001) and in Argentina in late 2001 and early 2002. More recently, there has been a surge in the literature on the consequences of the waves of capital flows on the macroeconomic performance as a result

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of the extremely loose monetary policy of the FED and monetary authorities in many advanced countries and the corresponding swelling of global liquidity spilled over to emerging markets.[1]

Turkey was among the first group of countries in the MENA region to liberalize its capital and financial account, a task which was completed as early as 1989. However, the post-liberalization experience for Turkey in the 1990s was not as successful as expected. Financial integration was implemented before undertaking the necessary reforms to ensure a strong and efficient financial system that would facilitate mobilizing the additional resources which has become available post-liberalization. As a result, the country underwent two serious crises in 1994 and 2001, both of which had financial roots underpinned by serious mismatches between the structure of liabilities and assets in terms of currency and maturity. Subsequently, Turkey embarked on serious structural and financial reforms in 2001. The banking sector reform proved to be an important catalyst of the broader reform agenda, resulting in a structural break that deserves a special treatment in the time-series analysis of the Turkish economic history.

The literature on the effects of capital mobility under financial account liberalization follows two theoretical tracks. The first approach draws heavily on the predictions of the neoclassical model where financial liberalization is expected to facilitate the efficient allocation of resources at an international level (Fischer, 1998; Obstfeld and Rogoff, 1996; Obstfeld, 1998; Rogoff, 1999). The second view, presented by Rodrik (1998), raises much doubt of the wisdom of liberalizing financial flows as a strategic public choice. The concerns were further substantiated in Eichengreen (2001, 2004) and Prasad, Rogoff, Wei, and Kose (2003) who questioned the wisdom of liberalization in the absence of defined measures to ensure the productive usage of inflows and the right institutional setting—including financial channels—to facilitate the efficient intermediation of these inflows.

So, does liberalization of financial flows necessarily increase the risk of crises or is it possible that it could be beneficial to growth by allowing for higher levels of capital accumulation? This question carries significant policy implications for many developing countries that are in the process of contemplating the speed and the degree of financial liberalization. To shed additional light on the underlying issues, it is necessary to understand how financial liberalization affects the dynamics of domestic macroeconomic variables in countries that have embarked on a higher degree of liberalization. Despite its importance, this issue has not been thoroughly explored (for a survey see Edwards, 2001; Eichengreen, 2001; Grilli and Milesi-Ferretti, 1995; Henry, 2003; Stiglitz, 2000).

In this paper, we shed light on the Turkish experience of financial liberalization and its effect on domestic macroeconomic variables, using quarterly data in a multivariate VAR model. The proposed methodology analyzes the dynamics of the interaction between financial flows and macroeconomic performance, and provides the necessary evidence to study the macroeconomic effects of financial liberalization. Among MENA countries, the Turkish economy provides a unique example in terms of domestic and external financial reforms throughout the 1980s; yet it experienced a financial crisis in 2001. Hence, the analysis will draw lessons that could prove informative for other countries in the region that have lagged behind in the process of financial liberalization.

Accordingly, we examine the macroeconomic effects of financial liberalization where we study many variables including a set of macroeconomic variables in the VAR (real interest rates, real effective exchange rates, real GDP, the inflation rate and crises dummies) to better assess the simultaneous effects of capital flows on economic performance during the period 1989–2009. We also take into consideration the crisis point in 2001 and estimate the effects of shocks, using quarterly data during the sub-periods 1989:01–2001:01 and 2001:02–2009:03. The sample period does not span the global financial crisis to avoid the structural break that is likely to have magnified capital outflows and subsequent implications, but is not entirely attributed to domestic conditions and Turkish specific policies as the recent experience of volatility of capital flows attests.

Our findings indicate that capital flows have varying effects on the Turkish economy before and after the crisis in 2001. Indeed, the evidence supports significant effects of liberalizing financial flows on macroeconomic performance, especially during the post-crisis period. Specifically, this period is featured by less inflationary pressures, which helped to stem the appreciation of the real exchange rate and preserve export competitiveness. In addition, the cost of credit was more contained, which helped to sustain credit and investment growth and contributed to real growth. Finally, there is significant evidence of sterilization policy aiming to curb the effects of capital inflows on the exchange rate and domestic liquidity in the post-crisis period. These findings are very timely to the recent experience of the Turkish economy that has slowed down on account of heightened risks of capital outflows in anticipation of normalization of monetary policy in the United States in 2015. Domestic policies should aim at countering the spillover effects of capital outflows on the domestic economy and reinforcing prudent policies and structural reforms to strengthen the underlying fundamentals of the Turkish economy and resume well managed capital inflows for robust liquidity and healthy credit growth.[2]

The rest of the paper is organized as follows. Section 2 provides the background of capital account liberalization in Turkey. Section 3 is reserved for descriptive analysis. Section 4

[1] See, e.g., Obstfeld (2009), Prasad (2011); Jeanne, Subramanian, and Williamson (2012) and Turner (2014).

[2] In support of the findings of the paper regarding the importance of capital inflows to the growth of the Turkish economy, Morgan Stanley in 2013 identified Turkey as one of the "Fragile Five Emerging Economies", citing potential vulnerability to the widely anticipated tightening of US monetary policy.

outlines the econometric methodology for investigation. Section 5 provides the empirical evidence, detailing the effects of capital flows on main macroeconomic indicators. Finally, Section 6 concludes the paper.

2. Financial flows and capital account liberalization in Turkey

Before the 1980's, Turkey followed an inward oriented import substitution strategy. However, the 1970's were the years of political conflicts and severe debt crisis. Following the new government in 1980s, Turkey changed its strategy both economically and politically towards a higher degree of openness and liberalization. Quantitative restrictions on trade were lifted and the country positioned itself towards a more export-oriented growth strategy.

On the financial and monetary sides, the Central Bank of the Republic of Turkey (Henceforth, CBRT) took important steps to reform the local financial sector by removing interest rate ceilings and freeing bank lending and borrowing. Reforms have increasingly focused on using indirect monetary policy instruments and introducing more flexibility into exchange rate management towards achieving a competitive real exchange rate policy, supported by a repressed real wage regime throughout the period 1981–1988. However, following significant losses on capital and foreign debt and imbalances in public sector finances, the exchange rate policy was replaced later by a broader financial reform package in August 1989 to better align the policy with the underlying economic fundamentals (Berument and Dincer, 2004).

As the country embarked on a higher degree of financial liberalization, the economy witnessed significant amounts of capital inflows in the aftermath of liberalization. Furthermore, the banking sector started to rely on short-term external borrowing from international markets which rapidly increased debt servicing and the situation turned into a Ponzi game associated with external financial speculation (Ekinci, 1996). As a result, sudden capital reversals started to be observed and the economy witnessed a new financial crisis in April 1994 leading to significant decline of GDP by more than 6% in the same year.

In 1995, the Turkish economy started to show signs of quick recovery from the crisis, thanks to the new set of adjustments brought into effect, allowing GDP to grow by 8%. The period 1996–1997 witnessed an increase that helped to overcome the difficulties of the current account. In addition, the registered improvement in international reserves and the loosening of the monetary policy contributed to a large extent to the enhancement of economic activity. The public debt started to increase as well as the burden of servicing external debt after the nominal depreciation announced by the CBRT that came as a response to higher inflation expectations.

As of December 1999, Turkey adopted a new disinflation program with the technical support of the IMF and another exchange rate regime that goes with the new hallmarks of the economy. The new regime is the crawling peg where the Turkish lira was linked to a basket of foreign currencies composed of the US Dollar and the Deutsche Mark. The new program gave encouraging signals as the economy registered a growth rate of 4.8% in early 2000 and the interest rate on the Treasury bond auction dropped from 96.4% in late 1999 to 34.1% in early 2000.

However, with the appreciation of the real exchange rate, the foreign currency debt of the banking sector increased to critical levels that were even threatening the soundness of the system. Furthermore, the current account rose significantly after the increase in the cost of imports. These imbalances were the origins of a sudden surge in capital outflows in late 2000 that contributed significantly to the banking crisis and the deterioration of international reserves of the CBRT. As a consequence, the crawling exchange rate regime was abandoned in early 2001 which resulted in a depreciation of the exchange rate with more than 90% and a contraction of the economic activity by 9.4%.

In May 2001, a new ambitious set of structural reforms was implemented that adopts a more rigorous macroeconomic discipline, a rehabilitation of the banking sector and more transparent management of public accounts. In this context, a more tight fiscal policy was adopted to have a better control of the public debt. In parallel, a large privatization program was initiated to support either the cleanup of the banking sector or the stabilization of the public debt.

The pack of reforms also witnessed the adoption of floating exchange rate regime that was heavily supported by the IMF and World Bank credits to increase the scope for effective monetary policy. The CBRT was called to strengthen its control over short-term interest rates in parallel with this floating regime.

The reforms showed immediate signs of improvement of the economy starting from late 2001: significant reduction of the public debt, decline of inflation rates along with higher output growth rates. The period 2002–2006 saw the Turkish economy reaping the macroeconomic benefits of these reforms with high growth rates decreasing inflation and public debt. These performances increased the confidence in the economy and lowered the risk premia accordingly. Nevertheless, despite such performances, the current account deficit remained very high due mainly to the significant presence of imports in production.

Starting from 2007, the Turkish economy was largely affected, first by the consequences of the financial turbulence of 2006 and, second, by the large political uncertainty and election process. It resulted in a lower growth that continued during subsequent years 2008 and 2009 due to increasing uncertainty around the world with the adverse effects of the global financial crisis and distortions in the major global markets of vital commodities i.e. oil, wheat, and gold.

However, following these crises the economy has emerged in a stronger position that strengthened its presence in the world as promising emerging economy with a high potential of growth. The economy seems to have well capitalized on its previous performance and especially the deep and structural reforms that have paid off to sustain growth and reap the benefits of capital inflows.

Table 1
Descriptive statistics.

	Before the crisis: 1989:01–2001:01				After the crisis: 2001:02–2009:03			
	Average	Max.	Min.	STDEV	Average	Max.	Min.	STDEV
International reserves (Million TRY)	20582.97	35924.7	6278.8	9214.29	69173.2	117611.7	29698.3	32457.37
Real GDP growth (%)	2.59	47.64	−21.68	20.82	4.84	21.66	−13.84	11.98
Inflation (CPI, %)	14.67	40.54	5.76	5.59	4.20	20.53	−0.37	4.46
Fiscal balance (% of GDP)	−5.14	0.90	−12.72	3.39	−5.54	2.63	−18.19	5.47
Change in REER (%)	0.82	12.59	−23.10	6.68	1.51	19.00	−17.86	8.70
Monetary growth (M1, %)	15.21	46.61	−20.02	13.73	8.27	69.91	−9.66	13.07
Interbank interest rate	73.25	211.46	31.00	34.28	26.64	71.82	8.05	17.34

Source: Authors' calculations based on International Monetary Fund (IMF) (2012), World Bank (2012) and CBRT (2012).

3. Descriptive statistics

To signify the importance of the 2001 crisis and subsequent reforms as a major structural change in the Turkish economy and investigate its relationship with key macroeconomic indicators, Table 1 reports the statistics relative to the mean, maximum, minimum and standard deviation of some key indicators during the pre- and post- 2001periods. The set of indicators include net international reserves as a proxy of capital account liberalization, real GDP growth, inflation based on the consumer price index, fiscal deficit, change in the real effective exchange rate, money growth (M1) and the interest rate measured by the overnight interbank rate.

It stands out from Table 1 that the Turkish economy is characterized by less volatility in real growth during the post 2001 period despite the lower average real growth. We note, likewise, high and persistent inflation during the pre-2001 period whereas in the second sub-period, the inflation rate decreased to single-digit numbers. The significantly lower inflation may be attributed to tight monetary policy and structural reforms. Indeed, monetary growth was significantly higher in the pre-crisis period, and higher inflation reflected itself in the much higher interbank rate, compared to the post-crisis period.

Efforts to improve public finances in the post-crisis period have resulted in larger surpluses, which coupled with higher growth, helped to put the public debt ratio on a downward trajectory. Indeed, the public debt ratio decreased significantly after 2001 and the debt ratio remained at sustainable levels estimated at 51% of GDP in 2009, despite higher fiscal deficits (−6% of GDP in 2009) even during the height of the global crisis in 2009.

The external position was further boosted by economic liberalization that led to mobilizing exports, as the share of exports to GDP increased from 18.66% to 23.63%, on average between the two sub-periods, resulting in improvement in the current account balance in the post crisis period. Further, economic reforms have paid off to mobilize investors' confidence and reduce uncertainty which increased the scope to attract financial inflows and high amount of international reserves, relative to imports.

External stability was further boosted by greater flexibility of the exchange rate in the post-crisis period which resulted in an increase of the local currency in nominal terms from 0.8 to 1.5 per US$. Despite significant reduction in the inflation rate, nominal appreciation of the Turkish lira has resulted in, on average, higher real appreciation of the currency, reflecting stronger external position in the post-crisis period.

4. Econometric methodology

To study the macroeconomic effects of capital account liberalization, we approximate an economy represented by a VAR model composed of a capital inflow variable and a vector of key macroeconomic variables, as follows[3]:

$$\begin{pmatrix} 1 & a_{12} \\ a_{21} & 1 \end{pmatrix}\begin{pmatrix} x_t \\ w_t \end{pmatrix}=\begin{pmatrix} a_{10} \\ a_{20} \end{pmatrix}+\begin{pmatrix} \alpha_{11} & \alpha_{12} \\ \alpha_{21} & \alpha_{22} \end{pmatrix}\begin{pmatrix} x_{t-1} \\ w_{t-1} \end{pmatrix}+\begin{pmatrix} \varepsilon_{x_t} \\ \varepsilon_{w_t} \end{pmatrix} \quad (1)$$

where x_t and w_t represent the capital inflows variable and a vector of macroeconomic variables respectively. ε_{xt} and ε_{wt} are orthogonalized disturbances.

Equation (1) can also be written in the following matrix form:

$$AY_t = B_0 + B_1 Y_{t-1} + \varepsilon_t \quad (2)$$

Since there is under-identification of the VAR in Equation (1), we may use a recursive system to identify the model by forming A as a lower triangular (Sims, 1980). This implies that x_t has a contemporaneous effect on w_t but the reverse is not true. Accordingly, Equation (2) is rewritten in a way that allows the identification of the structural shocks from the residuals of the recursive VAR model, as follows:

$$Y_t = C_0 + C_1 Y_{t-1} + e_t \quad (3)$$

where $C_0 = A^{-1}B_0$, $C_1 = A^{-1}B_1$ and $+ e_t = A^{-1}\varepsilon_t$. Thus, the structural shocks are identified from the residuals ε_{xt} (the residual of x_t in Equation (3)) and ε_{wt} (the residual vector of w_t in Equation (3)). Both residuals ε_{xt} and ε_{wt} affect the vector of key economic

[3] The advantage is modeling variables based on an economic structure that accounts for the transmission mechanism of the shocks to the various variables. The estimation of this model renders economic interpretation more meaningful, rather than relying on ad hoc estimation of a Vector error correction model that treats all variables as endogenous with respect to all shocks originating in the economic system, regardless of the order of the transmission mechanism imposed by economic theory.

variables of interest w_t *contemporaneously.* However, ε_{xt} affects *contemporaneously* only x_t. The identification of the orthogonalized residuals of the VAR according to a triangular form is known as the *Cholesky decomposition.*

Thus, an asymmetry is brought to the system through this latter restriction which makes the order of the variables important. The Turkish economy is assumed to be affected by capital inflows, but not vice versa, being small open economy with still many structural issues and political instability and foreign direct investment is not sizable enough compared to its economic performance.

4.1. Variables and data

The effect of capital account liberalization in Turkey is analyzed using a VAR model and we infer the effects of capital account liberalization and the resulting capital flow shocks on macroeconomic variables, while taking into account the effect of the crisis at the beginning of 2001. The variables included in the VAR are capital account liberalization (*KAL*), real interest rate (*INTER*), real effective exchange rate (*REER*), the money stock (*M*), real output (*y*) and the price index (*CPI*). The real private consumption and real investment are also included in the VAR afterward to test how demand variables respond to capital shocks.

The ordering of the variables in the VAR is important and the capital account proxy comes first, since the objective is to address its impact on macroeconomic variables. The real interest rate is put second since it is expected that capital flows would increase domestic liquidity, decreasing the nominal interest rate and the effect on the real interest rate would be dependent on accompanying inflationary effects. Similarly, under the prevailing flexible exchange rate regime in Turkey, capital inflow appreciates the nominal exchange rate of the Turkish Lira, which could be further reinforced via the build-up of inflationary pressures, and therefore the real exchange rate is placed third. The money stock and income per capita are put forth and fifth, respectively, as an increase in international reserves contributes to higher growth of the money supply which could be mobilized to increase real growth. Finally, the price level comes last in the ranking because of the direct effect of money growth on inflation. However, capacity constraints could hinder the growth momentum and fuel price inflation in the face of higher capital inflows. The allocation of higher liquidity between real growth and price inflation will be dependent on supply-side constraints and the elasticity to increase the output supply in the face of higher domestic demand.

Regarding the measures of the variables, the capital account liberalization (*KAL*) is proxied by net international reserves of the Central Bank.[4] *INTER* refers to the real interest rate equal to the difference between the nominal interest rate and the inflation rate, where the nominal rate is the overnight interbank rate and the inflation rate is calculated as the percentage change of the consumer price index. *REER* is the real effective exchange rate and is computed, according to the Central Bank of Turkey as the weighted geometric average of the prices in Turkey relative to the prices of its principal trade partners. *M* is the money stock in circulation (M1), *y* is the GDP[5] in 1998 prices, RCP is consumption in 1998 prices, RINV is investment in 1998 prices and *P* is the price level measured by the consumer price index as a measure of the price level. All data are obtained from the Central Bank of the Republic of Turkey (2010).

The variables are expressed in logarithm with the exception of the real interest rate. We also add constant quarterly seasonal dummies and dummy variable for the 1994 crisis and the late 2000 crisis. The different integration tests (Augmented Dickey-Fuller, Phillips-Perron and KPSS Tests) show that the variables are integrated of order one (I (1)) and their first differences are stationary (I (0)). Finally, the optimal lag of the VAR is determined using the Akaike information criteria. They are available upon request.

5. Empirical investigation

5.1. The impact of capital flows on macroeconomic variables

Figs. 1 and 2 display the impulse responses with 95% probability bands, using the bootstrap method with 500 draws, for the different variables included in the VAR after one standard deviation in capital flows over 16 quarters or four years.[6] The middle lines in the different figures refer to the median of the draws.[7]

It stands out from the figures that the effects are different if we consider the two sub-periods. Indeed, the effect of the capital inflow shock on the interest rate is negative during the first two quarters of the first sub-period 1989:01–2001:01, and it becomes insignificant during the second sub-period[8] 2001:02–2009:03.

Regarding the real effective exchange rate, a capital flow shock led to an appreciation of the local currency during three quarters of the first sub-period 1989:01–2001:01. Nevertheless, the appreciation seems to be short lasting, as it converges to its pre-shock level. In contrast, the insignificance of the effects during the post-crisis period may reflect less

[4] The widespread empirical literature reports many measures for capital account liberalization and most of them are indices or proportions (Chinn and Ito, 2006; Quinn, 1997; Rodrik, 1998). We use the net international reserves as a quantitative proxy. The VAR framework is based on the contributions of Kraay (1998) and Lane and Milesi-Ferretti (2001).

[5] GDP data is based on new National Account data announced by Turkish Statistical Institute (TURKSTAT) (2007). As the data start from 1998, the period covering 1987–1998 is calculated by the Authors using the growth rates of the old National Account data.

[6] We check the effect of capital flows on macroeconomic variables before and after the 2001 crisis. However, for the 1994 crisis it does not seem to affect the results as we took into consideration a dummy in the VAR, the output does not show any significant change.

[7] We used Eviews 8 Software to carry out the different estimations and graphs.

[8] We also carried out estimations that exclude the second quarter of 2001 (i.e., 2001:02) as it corresponds to the crisis period but the results do not display significant differences with those reported in Figs. (1) and (2).

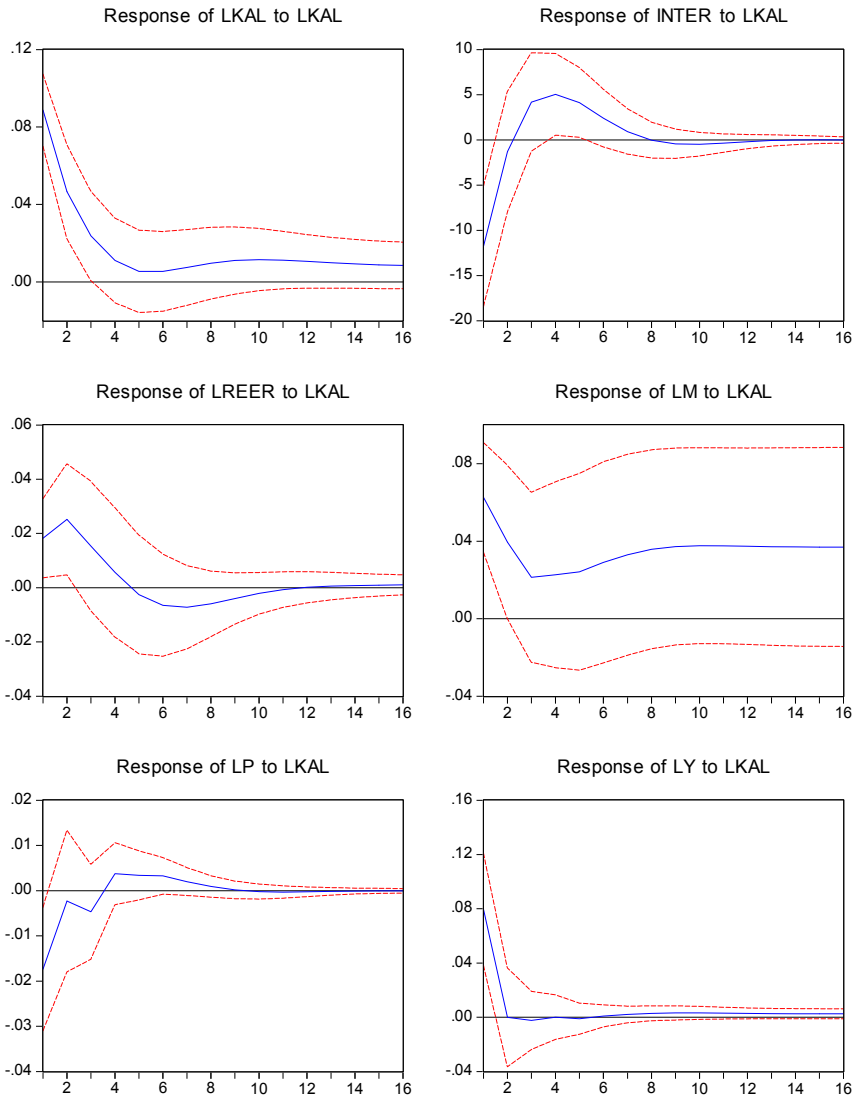

Fig. 1. Impulse responses of macroeconomic variables to one standard deviation of capital inflows before the crisis: 1989:01–2001:01.

inflationary pressures and, therefore, better ability to control real appreciation, compared to the earlier period.

During the second sub-period 2001:02–2009:03, impulse responses indicate a negative response of the money stock to capital inflows followed by a long-lasting positive effect. The difference reflects a deliberate attempt by monetary authorities to sterilize capital inflows in the post-crisis period in an effort to contain further surge in inflationary pressures which dominated the macroeconomic structure and demanded first priority in the design of macroeconomic policies.

To reinforce the previous points, we note that the effect of the shocks on consumer price inflation is also different between the pre- and post-crisis periods. Accordingly, sterilization efforts in the post-crisis period aimed at mitigating the inflationary effects of higher capital inflows. This is in contrast to price inflation in the pre-crisis period where the responses to capital inflows are almost insignificant.

Finally, regarding the impulse response function of real GDP to capital flows, the different figures show a general decrease in real output within the first quarter following the shock for each sub-period. In other words, the dynamic effect of one standard deviation shock in capital flows does not generate significant changes in real output starting from the second quarter. However, in light of significant sterilization, the positive effects of capital flows on real GDP appear shorter-lived and the reaction magnitude is smaller in the post-crisis period, compared to the pre-crisis period.

5.2. *Variance decomposition*

The variance decomposition analysis is carried out to see the importance of shocks to capital flows in explaining changes of key macroeconomic variables of the VAR model. Specifically, the variance measures the cumulative fluctuations over different horizons in the forecast error of changes in the capital flows proxy. We perform the forecast error variance decomposition of capital flows during pre- and post-crisis periods with 2, 4 and 8 quarters and the results are displayed in Table 2.

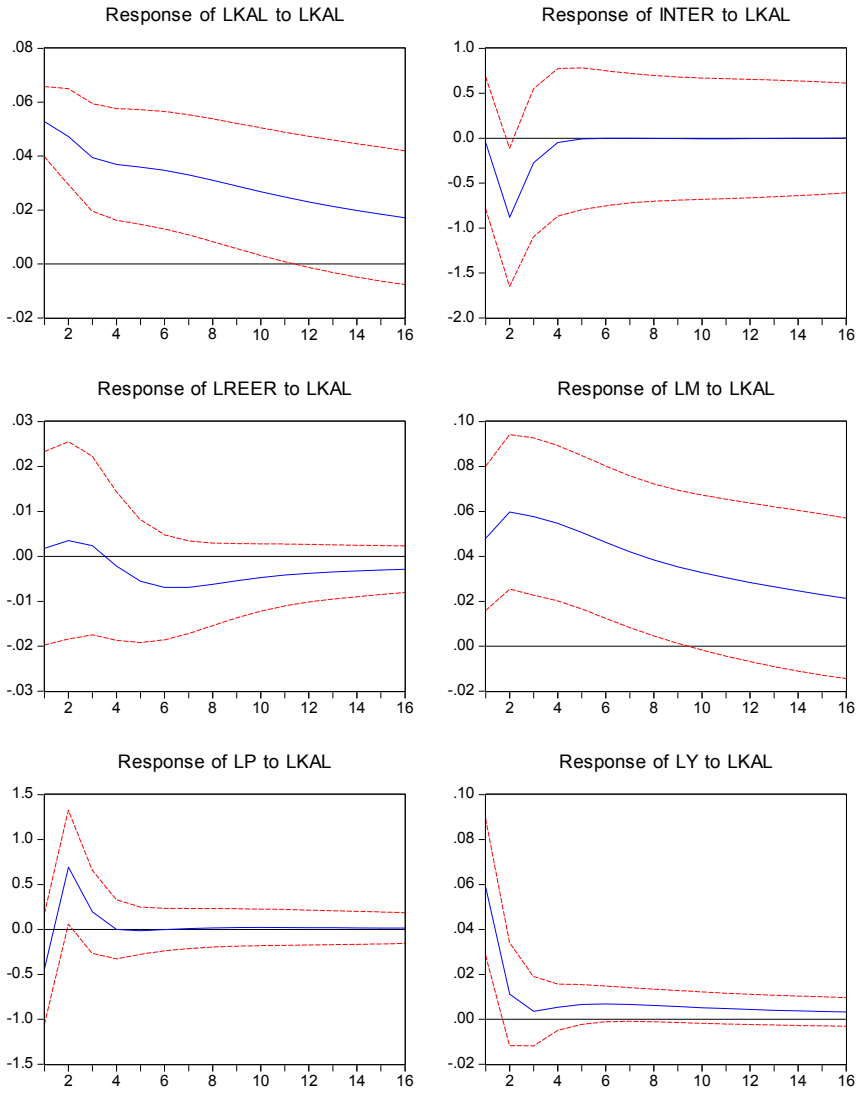

Fig. 2. Impulse responses of macroeconomic variables to one standard deviation of capital inflows after the crisis, 2001:02–2009:03.

Table 2
Forecast error variance decomposition of the capital account proxy, 1989:01–2001:01.

Horizon/period	LKA	INTER	LREER	LM	LP	LY
	Pre-crisis period: *1989:01–2001:01*					
2 quarters	95.42	0.08	0.40	2.22	1.17	0.67
	(5.47)	(1.63)	(1.04)	(2.53)	(2.25)	(2.64)
4 quarters	84.92	2.78	2.56	5.14	3.99	0.57
	(10.54)	(4.87)	(3.84)	(4.14)	(3.67)	(3.09)
8 quarters	60.05	17.17	6.39	8.49	7.49	0.38
	(19.06)	(13.05)	(6.85)	(5.29)	(4.45)	(3.15)
	Post-crisis period: *2001:02–2009:03*					
2 quarters	94.98	0.06	0.31	3.73	1.03	0.009
	(6.56)	(1.43)	(2.42)	(5.20)	(1.99)	(1.57)
4 quarters	83.9	0.66	0.26	12.85	1.76	0.53
	(13.64)	(2.91)	(5.02)	(12.16)	(3.47)	(3.62)
8 quarters	75.87	2.94	2.55	14.59	3.32	0.70
	(17.09)	(5.60)	(8.25)	(15.59)	(5.24)	(4.83)

Numbers between brackets are standard errors.

The first panel of results, relative to the pre-crisis period, indicates that capital account movements are accounted for mainly by their own shocks, which dissipate gradually over time (95%–60%). Likewise, shocks to the capital account contribute also to the change of the money stock, the consumer price index within a year and the interbank interest rate, after 8 quarters, with 17% of total variability. However, the effect of capital account movements on real GDP appears significantly smaller.

The results, reported in the second panel of the post-crisis period, are quite different from the first set, as the autonomous capital account shocks are explaining variations in capital flows with at least 76%. Moreover, with the exception of the money stock, the effects of the shocks have smaller effects on the remainder of key macroeconomic variables, compared to the earlier period. The evidence indicates persistent capital inflows to the Turkish economy, attesting to higher investors' confidence in the economy in the post-crisis period. Moreover,

available liquidity through this pool has contributed to the growth of the money supply towards mobilizing investment and real growth. Successful sterilization policies have mitigated the nominal effects of capital flows, compared to the earlier period.

5.3. Boom-bust cycles

In this section we investigate if the Turkish economy experienced a boom–bust cycle after the capital account liberalization. Generally, in economies with tight control of the financial account and less developed financial sector, liberalization of capital flows is likely to have large marginal returns. Accordingly, the periods following the liberalization of the capital account usually witness an expansion of economic activity with substantial increase in credit for investment and consumption, an appreciation of the real exchange rate and asset price bubbles. However, such effect is not likely to last indefinitely and the boom phase may tend to reverse itself as the economy reaches its potential and the bubble is bound to burst.

Indeed, continued appreciation of the real exchange rate in the face of persistent capital inflows may generate loss in the international competitiveness of exports, while increasing demand for imports and widening the current account deficits. The loss of competitiveness helps to slowdown the momentum of capital inflows as it reverses expectations about a booming economy that has large capacity to continue attract foreign capital flows. This, coupled with prudent policies including fiscal consolidation and tight monetary growth, usually help to reverse the cycle. If the reversal is managed gradually the adverse effects on the economy could be contained in the form of a gradual return to potential. However, if the reversal cycle is significantly delayed and abrupt, adjustments in the exchange rate following a bubble burst could mark the beginning of a bust cycle that exhibits higher capital outflows and a severe slowdown in economic activity. Indeed, the recent experience of a surge of capital outflow has been identified as a key risk factor for subsequent busts of the financial cycle. To stem the risk, macro prudential measures should be invoked in a timely manner in response to continued monitoring of the implications of capital flows to the domestic economy to ensure the stability of the financial system and hedge against the potential risks of capital outflows that could slow down the macro economy and risk stability of the financial system.[9]

To test if a boom–bust cycle happened after the liberalization of the capital account in Turkey, we perform impulse responses to see how demand variables respond to capital shocks. We use the same VAR structure as in Equation (1), although the w_t vector includes real demand variables which are real private consumption (*RCP*), real investment (*RINV*) and consumer price index (*CPI*). This latter variable is put last because of the possible effect of a higher domestic demand on price inflation.

As far as the Turkish economy is concerned, a close inspection of the impulse response functions of consumption, investment and the price index in Fig. 3 clearly demonstrates that the real activity seems to be closely linked to the evolution of aggregate demand during the two sub-periods. In contrast, during the post-crisis sub-period 2001:02–2009:03, the responses of aggregate demand to capital flows are larger and long-lasting, preserving the positive effects on growth and inflation (Fig. 4). It is worth noting the divergent nature of the impulse responses in Fig. 4, attesting to significant structural break that boosted aggregate demand in the post-crisis period on a sustainable basis, beyond the effect of capital flows. Such findings are similar to those of Montiel (1996) and Calvo, Leiderman, and Reinhart (1993), Calvo (1996) for the case of Latin American countries who found evidence of real exchange rate appreciation and consumption booms following capital inflows. However, it is worth noting a significantly smaller effect on consumption, compared to that on investment. The difference attests to the success of policies in Turkey to capitalize on capital inflows towards increasing investment and exports, hence mobilizing real growth and mitigating the corresponding inflationary effects.

6. Conclusion and policy recommendations

In this paper, we have tested the effects of capital account liberalization on macroeconomic variables using a VAR framework with quarterly data covering the period 1989:01–2009:03, ending before the turbulent episode surrounding the global financial crisis. We distinguish two sub-periods where the first one corresponds to the nineties period and the second period embraces the years post the 2001 financial crisis.

The general picture that emerges from the analysis of the two sub-periods, and in particular the post-crisis period (after 2001), is increasing effort to control money growth and price inflation in the face of higher capital inflows to avoid the adverse effects on competitiveness, export growth, credit growth, and real growth.

Moreover, the drive to ease capacity constraints and control government spending in the post-crisis period has helped to contain inflationary pressures. Indeed, the factual evidence attests to the fact that the appreciation in the real exchange rate was less pronounced in the post-crisis period, which helped to contain the adverse effects on export competitiveness and the current account deficit. In parallel, efforts to contain inflation have paid off to contain the increase in the cost of credit, which helped to mobilize credit growth and sustain the growth momentum.

The sharp contrast in the effects of capital flows on macroeconomic performance before and after the financial crisis in Turkey provides a testament of the need to enforce complementary domestic policies to maximize the return on capital flows. Efficient mobilization of financial flows requires a healthy financial system that is capable of availing resources for private activity, fiscal consolidation to contain inflationary pressures, and vigilant monetary policy to stem the risk of real exchange appreciation and effectively manage domestic liquidity. Absent these complementary policies, financial flows could be a curse

[9] See, e.g., Banks for International Settlements (2013, 2014).

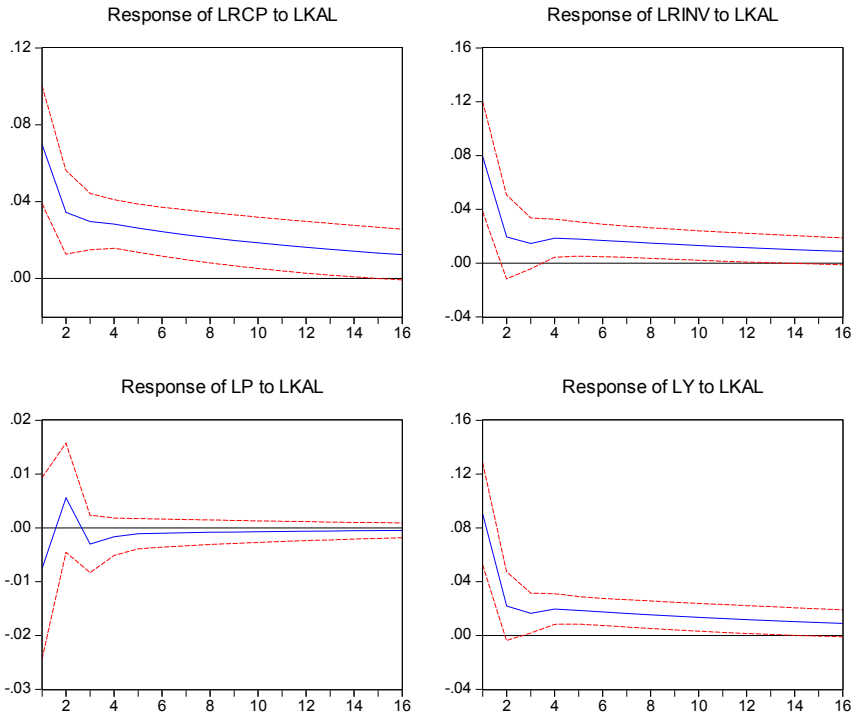

Fig. 3. Impulse responses of aggregate demand variables to one standard deviation of capital inflows before the crisis: 1989:01–2001:01.

on the economy as they could motivate a lax fiscal policy, fuel price inflation and appreciate the real exchange rate, resulting in loss of competitiveness that hinders private activity and real growth.

Problems are further compounded in the event of a crisis that erodes confidence and motivates capital outflows, as the recent experience of the Turkish economy demonstrates resulting in severe imbalances that build up external debt and increase the risk of sharp currency depreciation. As the recent events surrounding the global crisis have demonstrated, enforcing temporary capital controls may prove to be more prudent to mitigate the adverse effects of capital flows in the short term and the risk

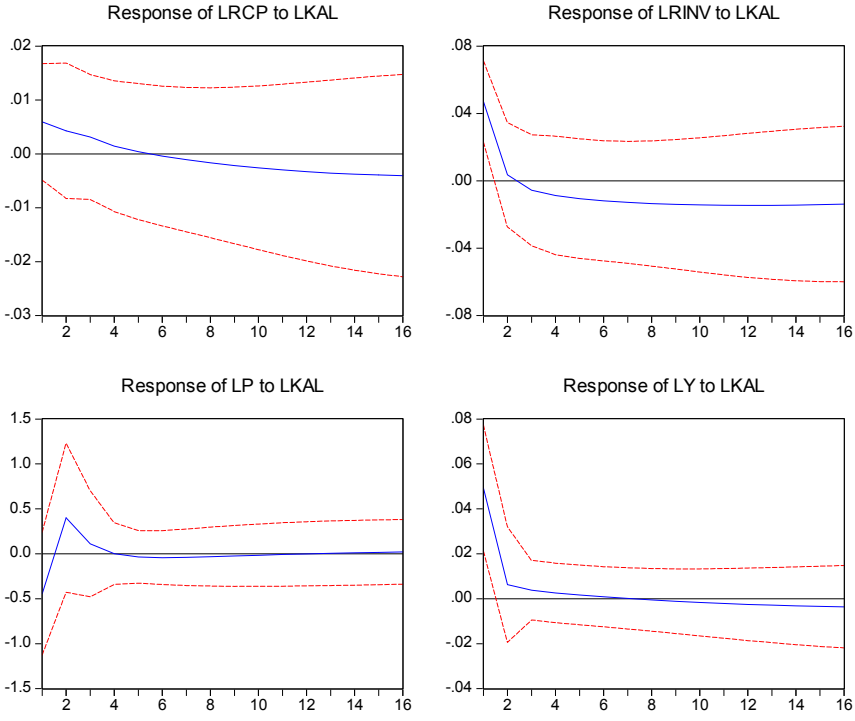

Fig. 4. Impulse responses of aggregate demand variables to one standard deviation of capital inflows after the crisis: 2001:02–2009:03.

of sudden stop that could escalate to a crisis of a large magnitude. In parallel, the central bank should strengthen its capacity to ensure financial stability in the banking system and invoke the right macro prudential measures in support of adequate liquidity and robust credit growth that stem the risks of sudden capital outflows. However, the success of these short-term measures hinges on complementary adjustment policies and structural reforms to reinforce economic fundamentals in order to sustain growth and mitigate short-term vulnerability that could jeopardize the growth agenda in the long-term.

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